Janich & Klass Computertechnik GmbH

ISA96 P7/106

Technical Description

Order Numbers:

404.258600.266 2	ISA96 P7/106 AMD-K6-2, 266MHz, Low Power
404.258600.300 8	ISA96 P7/106 AMD-K6-2, 300MHz
404.258600.450 2	ISA96 P7/106 AMD-K6-2, 450MHz

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22.05.00

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Table of Contents

1 Overview 7

2 Wiring Description 8

2.1 Logic Diagram 8
2.2 Processor 9
2.3 Chip Set 9
2.4 Main Memory 9
2.5 Video Controller 9
2.5.1 Video-I/O-Addresses 10
2.5.2 Memory Addresses 10
2.5.3 Operating Modes 10
2.5.4 Flat Panel Type 11
2.5.5 Video-BIOS 11
2.5.6 Driver-Software 11
2.6 Socket for PCI-Module 11
2.7 128KByte SCRAM 12
2.8 Flash-Disk 12
2.9 DiskOnChip® 12
2.10 Connecting the PS/2 Mouse 13
2.11 USB Interfaces 13
2.12 EEPROM 13
2.13 Watchdog 14
2.14 Survey Component LM78 14
2.15 I/O-Address Assignment 15

3 Fast Ethernet-PCI Module (Option) 16

3.1 Status-LEDs 16
3.2 Software Drivers 17
3.3 Useful Hints for the Ethernet Module 18

4 Jumpers & Switches 19

4.1 Core Voltage 19
4.2 Clock Frequency 19
4.3 Deleting the Standard-CMOS-RAM 20

5 Plug Assignment 21

5.1 Bus Assignment in ISA96 Bus Systems 21
5.2 Floppy Interface 22
5.2.1 Connector Assignment of the Floppy Interface 22
5.3 IDE-interfaces 23
5.3.1 Connector Assignment of the Standard IDE Interface 23
5.4 Serial Interfaces 24
5.5 Connector Assignment of the Parallel Interface 24
5.6 Monitor 25
5.7 Connector Assignment of the Keyboard Interface 25
5.8 Plug for Speaker Connection 26
5.9 Front Panel 26

6 BIOS 27
6.1 Power-On-Self-Test 27
6.1.1 Beep-Codes 27
6.1.2 Visual Messages on the Screen 27
6.1.3 POST-Codes 29
6.2 Setup 33
6.3 BIOS Update 48
7 Technical Data 49
8 Environment Conditions 49
9 Position Print 50
10 Appendix 51
10.1 Good to Know 51
10.1.1 External/Internal Floppy and IDE Drives 51
10.1.2 Requirements to 5V Supply 51
10.1.3 USB-BIOS-Extension 52
10.1.4 Problem: Interrupt Lines - Plug&Play 52

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Disclaimer

The contents of this manual are checked for matching the described product. Deviations cannot be excluded, so that we cannot give any guarantee for full accuracy. The details of this manual are however regularly checked. Necessary corrections will be contained in the subsequent revisions. We will be thankful for any improvement proposals.

Janich & Klass Computertechnik GmbH assume no liability for damages incurred directly or indirectly from errors in this manual, omissions, or discrepancies between this manual and the product.

Safety Hints

- This unit may not be used in any other way than described in this manual.
- Installation, putting into operation, and maintenance of this unit may exclusively be made by qualified personnel. This personnel must be familiar with the warnings and hints of this manual.
- Qualified personnel by means of this manual are persons who are familiar with installation, mounting, putting into operation and operation of this unit and who have the qualification fitting their tasks, like for example:

  - Education and instructions, respectively the authorization to switch on/off, to ground, and to tag current circuits and units resp. systems as per the actual standards of safety technique.
  - Education and instruction as per the actual standards of safety technique concerning maintenance and use of appropriate safety equipment.
  - Education in First Aid.

- Before you put this unit into a bus-rack, you have to check whether the required voltages are available at the specific connector pins, and whether the required currents can be fed.
- Before exchanging any units, the sub-rack must be switched off.
- This unit contains electro-statically endangered components. Electro-static discharge through the human body or similar must therefore by all means be avoided, for example, by prior touch to grounded metal parts (water pipe, etc.). This is important specially before exchanging the unit.
- You have to retighten all locking screws after every exchange.
- Protect this unit from moisture. By no means conductive matters or liquids may enter the unit.
- Do not operate the unit at higher temperatures than stated in this description.
- Connected wires may not be subject to tension load.

- Do not expose the unit to strong magnet fields, for the danger of data loss from the hard disk.
- The unit may not be exposed to strong vibrations, as they might destroy the hard disk.
- In case of a defective fuse, please by all means replace it with a new one of the same type, as otherwise fire danger exists.
- This unit contains a lithium battery. **ATTENTION!** Explosion danger at inadequate battery exchange. The battery may be replaced only with the same type, or with a type recommended by Janich & Klass. Used batteries must be disposed according to legal prescriptions.
- At visible damages of the unit, please return it to Janich & Klass for repair. (Each unauthorized repair may lead to loss of the guarantee.)
- Do not try to repair this unit on your own. Please always address yourself to Janich & Klass in case of eventual repair.
- Guarantee repair must always be made directly by Janich & Klass.

History

Revision	Date	Name	Modifications	HW-Revision
0.0	17.02.99	p.b	Preliminary Description	0.0
1.0	19.05.99	p.b	Adaptation to Hardware Rev. 1.0	1.0
1.1	17.08.99	p.b	Adaptation to BIOS Rev. 1.1	1.0
1.2	18.10.99	p.b	Net module added, new Appendix	1.0

1 Overview

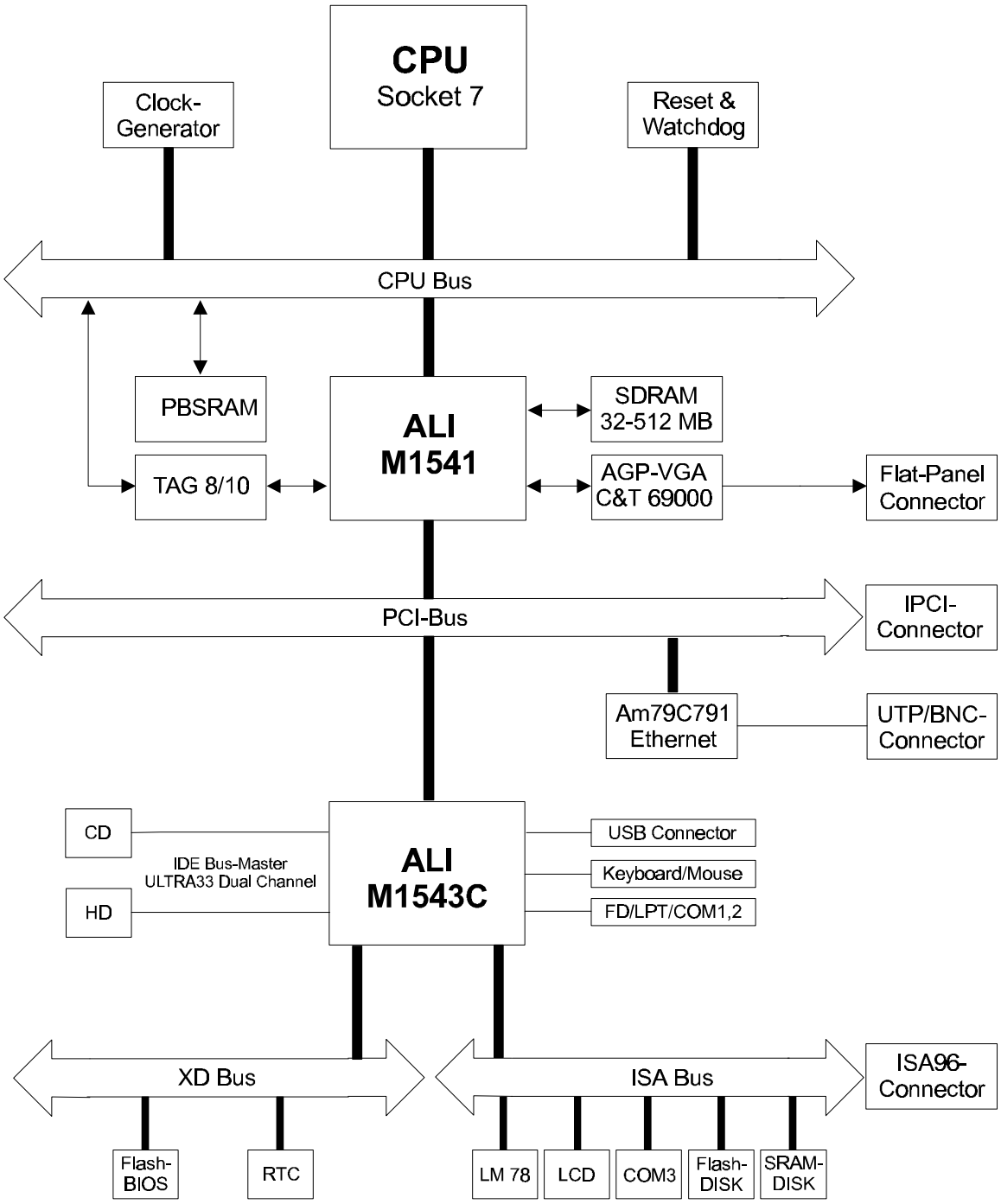
For applications with highest demands to processor capacity and memory size, the ISA96 P7/106 has been developed. It is equipped with a "Socket 7"-compatible processor with a clock frequency of actually up to 450MHz. The high data throughput is granted by, beside the bus frequency of 100MHz, also by the Pipelined-Burst-Cache, the synchronous DRAM, an AGP-VGA-controller, and by an PCI-IDE interface (Ultra-33 DMA). Different survey components, connected by the SMBus network, guarantee high operating safety.

The Technical Data of the ISA96 P7/106 in Short:

- 64Bit Pentium™-CPU, "Socket 7" compatible, clock frequency up to 450MHz, Bus frequency up to 100MHz.
- AGP VGA with 2MByte EDO video memory and interface for flat panels (compatible to ISA96 VGA/2).
- One DIMM socket for synchronous 64Bit-DRAM 16MByte up to 512MByte.
- 512KByte synchronous 64Bit-Pipelined-Burst L2-Cache.
- Licensed AWARD-BIOS and VGA-BIOS in a 256KByte EPROM.
- Two high performance PCI-IDE interfaces ("Ultra 33 synchronous DMA-Mode") of the interfaces is occupied by the integrated 2,5" hard disk; you may connect one or two IDE hard disks to the second interface.
- Floppy controller for 2 drives 1,44MByte.
- One AT-compatible multi-mode parallel-interface (ECP, EPP, PS/2, SPP).
- Three AT-compatible serial interfaces with 16 Byte FIFO. The interfaces can be configured via exchangeable modules.
- Keyboard controller with mini-DIN female plug on the front panel.
- Connection for PS/2 mouse on the front panel.
- Two USB interfaces.
- LM78 for survey of temperatures, fan and supply voltages.
- Watchdog, can be disabled.
- Copy of CMOS-SETUP in the EEPROM.
- LED displays on the front panel: "RU", "HD" and "GP".
- Bootable Flash-Disk as option, with Flash File System, size 2 or 4MByte.
- Battery-buffered SRAM-Disk, size 128KByte.
- Operating temperature 5-60°C, relative humidity 10-90% non-condensing.
- Power consumption 5V/4A; 12V/0,3A without serial modules and options.
- Available for the ISA96 Bus.

2 Board Description

2.1 Logic Diagram



2.2 Processor

For the processor, the ISA96 P7/106 offers a so-called "Socket7", so that all usual Socket7-compatible processors with an I/O voltage of 3,3V and a Core voltage of 1,8V...3,5V can be inserted. For exchanging the processor, you first must dismantle the heat sink. Then, the locking lever of the Socket7 can be set vertical. The processor is now lose and can be exchanged. Please notice when inserting the new processor that the angled edge of the processor fits the angled edge of the socket. At correct alignment, the processor must drop into the socket on its own. If you use force for this process, you risk damaging the processor and the socket! The locking lever is then pressed downwards again, and the heat sink can be mounted with just a few heat-conducting paste.

2.3 Chip Set

At modern (industrial) PC's, the majority of the functionality is integrated in the so-called chip set. The ISA96 P7/106 utilizes the chip set "Aladdin V" from Acer Labs Inc. (ALI), which consists of the two chips M1541 and M1543C. The M1541 connects the processor to the main memory and to the internal PCI-Bus. The M1543C connects the internal PCI-Bus to the integrated periphery and the ISA96-Bus. You can get the actual driver for the chip set either directly from Janich & Klass, or from ALI (www.acerlabs.com).

2.4 Main Memory

The ISA96 P7/106 has a socket for a 168pin SDRAM module with memory sizes from 16MByte to 512MByte. For Bus frequencies up to 66MHz (refer Chapter "Clock Frequency"), PC66 modules may be used. For Bus frequencies above 66MHz, it is indispensable to use PC100 modules, as otherwise the functionality of the ISA96 P7/106 can not be guaranteed.

For assembly of the main memory, the 168pin SDRAM modules must be turned until their two notches match with toes of the socket. The module is carefully inserted into the socket from above and is pressed down evenly with little force. The two locking hooks must click audibly. Inserting with wrong poles is possible only with strong force and will destroy the socket or the module!

The BIOS will automatically recognize the size of the assembled SDRAM modules.

2.5 Video Controller

The video controller of the ISA96 P7/106 is built up with a 69000 from Chips&Technologies. This video controller has already 2MByte integrated video-SDRAM; it works on the AGP-Bus of the chip set with a clock frequency of 66MHz and can support nearly all actually available flat panels. The connector for an analog monitor is already placed on the main board. If a flat panel shall be used, a driver module to match the panel must still be assembled.

2.5.1 Video-I/O-Addresses

3B0h - 3B3h	
3B4h	CRTC Index (MDA Emulation)
3B5h	CRTC Data Port (MDA Emulation)
3B6h - 3B9h	reserved
3BAh	Input Status Register 1 (ST01) / Feature Control Register (FCR)
3BBh - 3BFh	reserved
3C0h	Attribute Controller Index
3C1h	Attribute Controller Data Port
3C2h	Input Status Register 0 (ST00) / Output Register (MSR)
3C3h	reserved
3C4h	Sequencer Index
3C5h	Sequencer Data Port
3C6h	Color palette Mask
3C7h	Color palette State / Color Palette Read Mode Index
3C8h	Color palette Write Mode Index
3C9h	Color palette Data Port
3CAh	Feature Control Register (FCR)
3CBh	reserved
3CCh	Misc. Output Register (MSR)
3CDh	reserved
3CEh	Graphics Controller Index
3CFh	Graphics Controller Data Port
3D0h	Flat Panel Extensions Index
3D1h	Flat Panel Extensions Data Port
3D2h	Multimedia Extensions Index
3D3h	Multimedia Extensions Data Port
3D4h	CRTC Index (CGA Emulation)
3D5h	CRTC Data Port (CGA Emulation)
3D6h	Configuration Extensions Index
3D7h	Configuration Extensions Data Port
3D8h - 3D9h	reserved
3DAh	Input Status Register 1 (ST01) / Feature Control Register (FCR)
3DBh - 3DFh	reserved

2.5.2 Memory Addresses

A0000h - AFFFFh	Video memory, as per image format
B0000h - BFFFFh	
B8000h - B8FFFh	
A0000h - BFFFFh	
C0000h - CBFFFh	48KByte Video-BIOS

2.5.3 Operating Modes

The video controller supports the following operating modes:

- display image on an analog monitor
- display image on monochrome- and color-LCD, EL panel or Plasma panel
- simultaneous isplay on both monitor and flat panel

At system start it is checked whether an analog monitor is connected. If so, graphics are displayed on it. If no monitor is connected, the graphics are displayed on the flat panel.

The simultaneous operating mode is not restricted to any special graphics formats, but is possible with nearly all graphics formats.

At simultaneous mode (CRT monitor and flat panel), please notice that both panel types must work with the same resolution. So, it is not possible to set the CRT monitor to a resolution of 800x600, if the connected flat panel works with 640x480 pixels resolution.

2.5.4 Flat Panel Type

If a flat panel shall be connected to the ISA96 P7/106, you have to set the type of panel in advance at rotary switch SW1. Actually, the following panel types can be set:

SW1	Display Type
F	Mono, 640x480, 8Bit, Dual Scan
E	FSTN, 640x480, 16Bit, Dual Scan
D	TFT, 640x480, 18Bit
C	TFT, 640x480, 9Bit
3	TFT, 1024x768, 2x18Bit

Attention: This setting is critical! A wrong setting may lead to destruction of the connected flat panel!

2.5.5 Video-BIOS

The BIOS of the video controller is fully compatible to the Standard IBM VGA BIOS and the interrupt 10h video service functions. These interrupt 10h standard functions are described in detail in diverse publications and are no subject of this description.

All BIOS extensions which surpass the VGA Standard are documented in the separate BIOS Description "BIOS_69.PDF". Mainly, the BIOS functions are described, with which one can switch between the different display modes (only flat panel, only analog monitor, or simultaneous operation).

2.5.6 Driver-Software

Device drivers for the video controller of the ISA96 P7/106 are available for Windows-95, Windows-98 and Windows-NT 4.0. Please get the actual driver either directly from Janich & Klass, or from Chips & Technologies (www.chips.com).

2.6 Socket for PCI-Module

The header **S27** is a position for an optional PCI module (for example, Fast-Ethernet). The actual Janich & Klass Price List will tell you which PCI modules are actually available.

2.7 128KByte SCRAM

Placed on the ISA96 P7/106, in addition to the SDRAM main memory, is a 128KByte static CMOS-RAM (SCRAM), which contents can be buffered by the internal Lithium battery.

The SCRAM can be used in two different ways:

linear: The SCRAM is switched into the memory area, either complete, or partly directly between 0D0000h and 0EFFFFh. The required size and start address can be set in the BIOS-Setup on page "Special Features Setup" under menu item "On-Board Static RAM". Surely, the set address area may not be assigned by other cards.

switched: In this operating mode, the SCRAM is divided to blocks of 16KByte each, of which always only one block at a time is switched into the memory address area between 0CC000h and 0EFFFFh. Via an I/O port, the number of the block to be switched in can be set. The start address of the 16KByte area can be set in BIOS-Setup on page "Special Features Setup" under menu item "On-Board Flash-Disc". This operating mode is compatible to the EPROM-Disk of the former ISA96 CPU cards, so that, for example, a battery-buffered 128KByte virtual hard disk can be switched in by using the MSDOS-driver ECDISK.SYS.

If the SCRAM shall be buffered by the battery, jumper **J6** must be set. If this is not desired, this jumper should not be set, in order to prolong the lifetime of the battery.

2.8 Flash-Disk

Optionally, the ISA96 P7/106 is assembled with 2MByte or 4MByte Flash-EPROM, with which you can build an up to 4MByte large virtual hard disk drive (Flash-Disk).

The Flash-EPROM is switched in as 16KByte large block in the memory address area between 0CC000h and 0EFFFFh. The start address of the block can be set in BIOS-Setup on page "Special Features Setup" under menu item "On-Board Flash-Disc". Certainly, the set address area may not be assigned by other cards. Furthermore, the Flash-Disk still requires two Bytes in the I/O address area, whose start address can also be set in BIOS-Setup.

For creating the required file system on the Flash-EPROM, you will require the Janich & Klass Flash-File-System (please refer the separate Description). Then, the Flash-Disk is bootable also with this Flash-File-System.

2.9 DiskOnChip

A Flash-Disk-Chip from the company M-Systems ("DiskOnChip®") can be plugged into socket EP1. This chip already contains a Flash-File-System, it is bootable, and it works with all usual operating systems. Actually, this chip is available in sizes between 2MByte and 114MByte.

The Flash-Disk-Chip in socket EP1 is switched in as 16KByte block in the memory address area between 0CC000h and 0EFFFFh. The start address of the block can be set in BIOS-Setup on page "Special Features Setup" under menu item "On-Board Socket EP1".

Installation:

1. Switch your computer system off and take out the ISA96 P7/106.
2. Carefully insert the DiskOnChip into the socket marked "EP1". **Attention:** The point on the chip (Pin 1) must show in the same direction as the edge in the socket!
3. Put the ISA96 P7/106 back into the computer system and switch on your system again..
4. During the boot procedure, watch for messages from the DiskOnChip.
5. If the DiskOnChip is the only mass memory in your system, it will become available after booting as hard disk C:
6. If, besides the DiskOnChip, further hard disks exist in the system, it will be available after booting as the last hard disk, if not configured differently (refer "DiskOnChip 2000 Utilities User Manual").
7. If the DiskOnChip shall be able to boot, please note the following:
   - Copy the operating system on the DiskOnChip, for example with the MSDOS command "sys d:".
   - The DiskOnChip should be the only bootable drive in the system, respectively it should be configured as first drive with the utility "DUPDATE".

2.10 Connecting the PS/2 Mouse

Built into the front panel of the ISA96 P7/106 is a 6pin mini-DIN female plug where a PS/2 mouse can be connected. For using this interface, the menu "PS/2 Mouse Function Control" must be "enabled" in BIOS-Setup on page "BIOS Features Setup". Furthermore, in the setup page ”Special Features Setup”, the menu item "IRQ12 Routing" must be set to "PS/2-Mouse". The interrupt line IRQ12 is then assigned by the PS/2 mouse controller and no longer available on the ISA96-Bus!

2.11 USB Interfaces

The front panel of the ISA96 P7/106 offers two equivalent USB interfaces (Universal Serial Bus) for connecting periphery units. The USB interfaces meet the USB Specification 1.1 and therefore allow transmission rates of 12Mbit/s. USB units are "hot-plug"-able, i.e. they may be plugged on and -off during operation of the P7/106. For operating USB units, certainly an operating system is required which supports the USB interfaces, like e.g. Windows 98.

2.12 EEPROM

The ISA96 P7/106 also features a 256Byte EEPROM. It usually contains a 1:1 image of the Setup parameters which are stored in the Standard-CMOS-RAM. Should the battery fail, the data in the Standard-CMOS-RAM become invalid. The BIOS of the ISA96 P7/106 will then read the parameters which were stored latest in the EEPROM, and will write them back into the Standard-CMOS-RAM. This way, the computer can still boot after a battery failure without user action. In such a case, however, date and time are wrong and must correspondingly be corrected.

In order to prevent that in case of invalid CMOS-RAM data automatically the contents of the EEPROM are copied into the CMOS-RAM, set Jumper **J4** (this will make sense only in the rare case that the EEPROM holds senseless data). Then, all adjustments in the Setup have to be repeated and must again be stored in the CMOS-RAM. Afterwards, Jumper **J4** can be removed again.

2.13 Watchdog

The ISA96 P7/106 features a Watchdog that creates a hardware Reset if it is not triggered periodically by the running program within a certain time. This can considerably improve the reliability of the whole system.

In the BIOS-Setup, the page "Special Features Setup" allows to set different trigger periods between 250ms and 32s. The Watchdog can also be disabled completely. To allow the system to boot at all, the Watchdog becomes active only after it was triggered for the first time.

Triggering the Watchdog:

As already mentioned, the Watchdog becomes active only when it is triggered for the first time. Triggering is affected for 16Bit-operating systems (MSDOS, for example) by calling the BIOS interrupts 0AFh, where the AH register must be zero. Please read the "Description of the BIOS Expansions " for ISA96 P7/10x.

32Bit operating systems (Windows 9x, NT) require a specific driver software from Janich & Klass.

2.14 Survey Component LM78

For surveying the supply voltages, the temperatures, and the fan, the hardware monitor LM78 from National Semiconductors was integrated on the ISA96 P7/106. By using the drivers available from Janich & Klass (MSDOS, Windows9x, Windows-NT), you can query the following measuring readings:

- Supply voltages: Core voltage, 3.3V, 5V, 12V and -12V
- Temperatures: Card temperature and CPU temperature
- Fan: Propeller rotation frequency

Furthermore, you can set limit values for each measuring. When surpassed, the LM78 can generate an NMI. The user program is thus enabled to take measures to prevent the total system from damage.

2.15 I/O-Address Assignment

Within the I/O address area from 0000h to FFFFh, the ISA96 P7/106 occupies the following addresses:

0000h-000Fh	DMA controller 1
0020h-0021h	Interrupt controller 1
0040h-0043h	Timer component
0048h-0050h	LM78
0050h-0053h	P7/106 configuration port
005Ch-005Fh	Front panel diagnosis LCD
0060h	Keyboard controller data port
0061h	System status bits (Port B)
0064h	Keyboard controller command port
0070h-0071h	Real time clock & CMOS-RAM
0080h	Diagnosis display
0080h-008Fh	DMA-Page-Register
0092h	System status bits (Port A)
00A0h-00A1h	Interrupt controller 2
00C0h-00DEh	DMA controller 2
00F0h-00F1h	Co-processor
01F0h-01F7h	Hard disk (if an ISA96 FILECARD does not exist)
0278h-027Fh	LPT2 (if LPT1 on external card)
02E8h-02EFh	COM4 (if COM2 on external card)
02F8h-02FFh	COM2 (if not on external card)
0378h-037Fh	LPT1 (if not on external card)
03E8h-03EFh	COM3 (if COM1 on external card)
03F2h-03F7h	Floppy-Disk (if an ISA96 FILECARD does not exist)
03F8h-03FFh	COM1 (if not on external card)
0481h-048Bh	DMA-High-Page-Register
04D0h-04D1h	Interrupt controller 1/2
0CF8h-0CFCh	PCI configuration port

Furthermore, still those I/O-addresses are assigned which were selected during Setup for the additional functions (COM3, EPROM-Disk).

3 Fast Ethernet-PCI Module (Option)

The Janich & Klass Fast Ethernet-PCI Module "P7 Net Module 10/100Base-TX" can be mounted on the Onboard-PCI slot of the P7/106. This Fast-Ethernet card for the P7/106 is equipped with the controller AM79C973 from AMD. It supports 10Base-T and 100Base-TX networks. The UTP female plug for connecting a Standard-Twisted-Pair network cable can be reached via the front panel.

General Features

- Fast Ethernet controller AM79C973 with 32bit PCI-Bus interface
- Integrated 10Base-T and 100Base-TX interface
- Auto negotiation for 10Base-T and 100Base-Tx respectively semi and full duplex
- Meats the requirements as per IEEE/ANSI 802.3
- Full duplex operation at 10MBd/100MBd
- 12KByte chip-internal FIFOs for Rx and Tx
- 3 LEDs on the front panel for checking the network activities
- EEPROM for non-volatile storage of user-specific settings
- Software-compatible to components from the AMD Pcnet family
- Ample driver software PCnet Family for nearly all platforms.

3.1 Status-LEDs

The network adapter controls 3 yellow LEDs (LN1, LN2, LN3), that are found on the front panel below the network female plug. These LEDs can display status information about condition and activity of the networks and controllers. The factory settings are as follows:

LN1: Link Integrity. This LED lights at trouble-free network link (therefore constantly during normal operation).

LN2: Transmit Status. This LED lights at send activity of the network controller.

LN3: 100Base-TX. The LED is on, when the adapter works in 100MBaud mode. Otherwise, the adapter is in 10Base-T mode. Recognition of and switch-over to the actual network type is affected automatically.

The function assignment of the LEDs can partly be set by means of the network drivers (depending on driver and platform). During driver installation under Windows, for example, also values for LED0 up to LED3 can be set. Here correspond LED0 = LN1, LED1 = LN2, LED2 = LN3, and LED3 is not realized on the network adapter.

We recommend to not alter these settings! First, the drivers (at least for now) do offer some meaningful configurations **not**, and secondly some drivers will, at such an alteration, remanently rewrite the internal configuration of the network controller, causing severe problems, as we experienced ourselves.

If it still seems to be required to modify the LED configuration, the following information will be useful. The LED configuration is displayed during the driver setting (actually) in form of an integer value per LED. The meaning of some interesting bits of this value is listed below:

Bit0=1: Collision Status. The LED lights, when collisions are remarked on the network.

Bit2=1: Receive Status. The LED lights during receiving activity on the network.

Bit4=1: Transmit Status. The LED lights during sending activity of the controller.

Bit5=1: Receive Match Status. The LED lights, when the controller receives protocols to its (node) address.

Bit6=1: Link Status. The LED lights at a trouble-free network link (therefore constantly at normal operation).

Bit7=1: Pulse Stretcher. If this Bit is 1, the lighting of the LED is prolonged to get visible to the eye also at short activities.

Bit8=1: Full Duplex Link Status. The LED lights, when the controller is in Full-Duplex operation.

Bit12=1: 100BMd Enabled. The LED lights, when the controller works in 100MBaud mode.

All bits can be combined with each other, so that, for example, the value 0094h means that the LED lights at sending and receiving activity, where the signal is prolonged.

The basic setting stated above corresponds to the following values:
LN1 = 00C0h, LN2 = 0090h, LN3 = 1080h.

3.2 Software Drivers

Software drivers from AMD for the P7 Net modules are available on request, free of charge. They cover a majority of usual operating systems.

Please find the most actual drivers on the Web Page of AMD:
http://www.amd.com

In their actual Version 4.51, the "Pcnet Family Driver" contain drivers for the following operating systems respectively platforms:

- DOS
- Netware Server AHSM
- Netware Server CHSM
- Netware Workstation
- OS/2
- PCNFS
- SCO UNIX OpenServer and ODT
- SCO UnixWare
- SUN Solaris
- Windows 3.1
- Windows 3.11
- Windows 9x
- Windows NT 3.50
- Windows NT 3.51
- Windows NT 4.0
- Windows CE 2.1
- Windows 2000 Beta
- VxWorks Driver
- Packet Driver

3.3 Useful Hints for the Ethernet Module

Key word Auto Negotiation:
The network controller supports Auto Negotiation related to Half and Full Duplex switch-over, and related to 10Base-T and 100Base-TX switch-over. This means the following: The network controller periodically informs the other network members via so-called Link-Pulse protocols, containing information about its capabilities, especially supported modes and possible Baud-rates. In reaction, it evaluates the Link-Pulse protocols of all other members at a network segment. This way, the largest common denominator of all segment members is evaluated, and this one is automatically set. For the user, the necessity is voided to manually set the network configuration in these items.
This network controller works in 100Base-TX and 10Base-T networks, both in Half and Full Duplex mode, without the need for any settings.

Key word Driver Installation:
During installation of the network drivers for Windows 9x (and possibly also for other platforms) the user is requested at some driver versions to make driver settings concerning I/O address, DMA channel and IRQ line. These settings must not and should not be made, as the network controller is a PCI component, able for Plug&Play like all other PCI components. This means that the resource administration of such components concerning I/O and memory addresses, DMA and interrupt lines is affected dynamically by the BIOS of the P7/106. (It can eventually still be modified later by the operating system.)
After installation of the network drivers and a re-start of the system, these setting possibilities for driver configuration are (correctly) no longer available.
Furthermore, the user is often asked during driver installation for type and make of his network card, and a corresponding dialog box is displayed. Please select the manufacturer "Advanced Micro Devices” respectively "AMD” and the card type "AMD PCNET Family Ethernet Adapter (PCI)” (or a similar denomination which contains the term "PCI”.)

4 Jumpers & Switches

4.1 Core Voltage

On the ISA96 P7/106, the core supply voltage of the CPU chip is adjustable in steps of 0,1V- resp. 0,05V between 1,8V and 3,5V. If you want to exchange the CPU chip, please find out first which core voltage the new CPU chip requires. Most of the chips have this value printed on their case. Then, you have to set exactly this voltage by means of the Jumper field **S5** as per the following table:

S5 e d c b a	CPU Core Voltage
☐☐☐☐☐	2,0V
☐☐☐☐☒	2,1V
☐☐☐☒☐	2,2V
☐☐☐☒☒	2,3V
☐☐☒☐☐	2,4V
☐☐☒☐☒	2,5V
☐☐☒☒☐	2,6V
☐☐☒☒☒	2,7V
☐☒☐☐☐	2,8V
☐☒☐☐☒	2,9V
☐☒☐☒☐	3,0V
☐☒☐☒☒	3,1V
☐☒☒☐☐	3,2V
☐☒☒☐☒	3,3V
☐☒☒☒☐	3,4V
☐☒☒☒☒	3,5V

S5 e d c b a	CPU Core Voltage
☒☐☐☐☐	-
☒☐☐☐☒	-
☒☐☐☒☐	-
☒☐☐☒☒	-
☒☐☒☐☐	-
☒☐☒☐☒	-
☒☐☒☒☐	-
☒☐☒☒☒	-
☒☒☐☐☐	-
☒☒☐☐☒	-
☒☒☐☒☐	1,80V
☒☒☐☒☒	1,85V
☒☒☒☐☐	1,90V
☒☒☒☐☒	1,95V
☒☒☒☒☐	2,00V
☒☒☒☒☒	2,05V

In this Table, ☐ means: "Jumper not set", and ☒ "Jumper is set".

4.2 Clock Frequency

The clock frequency of the CPU chip is determined by two Jumper fields: Jumper field **S2** sets the Bus frequency, which is fed to the CPU chip from outside, while **S14** determines the multiplicator of the CPU core. The product of both then is the clock frequency of the CPU chip. Example: Bus frequency 66MHz, multiplicator 3,5 - results as a clock frequency of about 300MHz.

Attention: You must observe by all means that the product of Bus frequency and multiplicator never surpasses the clock frequency indicated by the CPU chip manufacturer! Usually, this maximum clock frequency is printed on the CPU chip case.

The following table illustrates the meaning of jumper fields **S2** and **S14**:

S2c	S2b	S2a	Bus-Frequency
☐	☐	☐	100,0 MHz
☐	☐	☒	95,3 MHz
☐	☒	☐	83,3 MHz
☐	☒	☒	75,0 MHz
☒	☒	☐	66,8 MHz
☒	☒	☒	60,0 MHz

S14c	S14b	S14a	Multiplicator
☐	☐	☒	2,0
☐	☒	☒	2,5
☐	☒	☐	3,0
☐	☐	☐	3,5
☒	☐	☒	4,0
☒	☒	☒	4,5
☒	☒	☐	5,0
☒	☐	☐	5,5

In this table, ☐ means ”Jumper not set", and ☒ "Jumper is set".

4.3 Deleting the Standard-CMOS-RAM

All parameters that can be changed via the BIOS-Setup are stored in the Standard CMOS RAM. After switching the computer off, they are buffered by the battery. Should these data once be modified uncontrolled, for example, by a program, it may happen that the ISA96 P7/106 will not boot correctly. In such cases, Jumper **J5** must be set at switched-off computer, and be removed again after about 10 seconds. The contents of the Standard CMOS RAM is then declared invalid. The BIOS will then use the default values stored either in the EEPROM or in the EPROM.

5 Connector Assignments

5.1 Bus Assignment in ISA96 Bus Systems

Attention: The ISA96 P7/106 can be used only in systems with ISA96 Bus!

	a	b	c	
1	GND	/MASTER	/IOCHCK	**1**
2	RESET	SD15	SD7	**2**
3	+5V	SD14	SD6	**3**
4	IRQ9	SD13	SD5	**4**
5	/MEMR	SD12	SD4	**5**
6	DRQ2	SD11	SD3	**6**
7	-12V	SD10	SD2	**7**
8	/0WS	SD9	SD1	**8**
9	+12V	SD8	SD0	**9**
10	GND	/SBHE	IOREADY	**10**
11	/SMEMW	LA23	AEN	**11**
12	/SMEMR	LA22	SA19	**12**
13	/IOW	LA21	SA18	**13**
14	/IOR	LA20	SA17	**14**
15	/DACK3	LA19	SA16	**15**
16	DRQ3	LA18	SA15	**16**
17	/DACK1	LA17	SA14	**17**
18	DRQ1	/DACK7	SA13	**18**
19	/REF	DRQ7	SA12	**19**
20	CLOCK	/DACK6	SA11	**20**
21	IRQ7	DRQ6	SA10	**21**
22	IRQ6	/DACK5	SA9	**22**
23	IRQ5	DRQ5	SA8	**23**
24	IRQ4	/DACK0	SA7	**24**
25	IRQ3	DRQ0	SA6	**25**
26	/DACK2	/MEMCS16	SA5	**26**
27	TC	/IOCS16	SA4	**27**
28	BALE	IRQ15	SA3	**28**
29	+5V	IRQ14	SA2	**29**
30	OSC	IRQ12	SA1	**30**
31	/MEMW	IRQ11	SA0	**31**
32	GND	IRQ10	GND	**32**

5.2 Floppy Interface

The ISA96 P7/106 has an interface for one or two floppy drives 3,5" (1,44MByte). Only a 34pole flat ribbon cable is required to connect the 34pin header row **S24** to the floppy drive(s).

This cable is to be made as follows:

The length depends on the mechanical composition of the computer, it should however not exceed 46cm. A 34pole female plug is mounted on the CPU-sided end. About 10cm before the other end, there is a 34pin direct plug connector. This is the connector for the second drive. Behind this plug, wires 10 and 16, 11 and 15, and 12 and 14 are interchanged and connected to a second 34pole direct plug, which is the plug for the first drive. If 3.5" drives shall be used, please foresee 34pole female plugs instead the 34pole direct plug connectors.

Attention: Before using newly installed drives, the user has to change the floppy type in the BIOS-Setup.

Attention: If a second floppy controller exists on the ISA96-Bus (e.g. Filecard, FD-Card), the floppy controller on the ISA96 P7/106 must be disabled manually in the Setup!

5.2.1 Connector Assignment of the Floppy Interface

S24
34pin Header Row

GND	1	2	RWC/RPM
GND	3	4	
GND	5	6	
GND	7	8	/INDEX
GND	9	10	/MOTOR ON 1
GND	11	12	/DRIVE SELECT 2
GND	13	14	/DRIVE SELECT 1
GND	15	16	/MOTOR ON 2
GND	17	18	/DIR
GND	19	20	/STEP
GND	21	22	/WDATA
GND	23	24	/WGATE
GND	25	26	/TRACK 0
GND	27	28	/WRITE PROTECT
GND	29	30	/RDATA
GND	31	32	/HEAD SELECT
GND	33	34	/DISK CHANGE

5.3 IDE-interfaces

The ISA96 P7/106 has two high performance PCI-IDE interfaces, which also support the "Ultra 33 synchronous DMA-Mode" at up to 33Mbytes/sec.

The first (primary) IDE-interface at header row **S20** is reserved for a 2,5" hard disk. This hard disk is mounted on the ISA96 P7/106 and connected via flat ribbon cable.

The second (secondary) IDE-interface is available at the 40pin header row **S21**. Here, one or two IDE drives (hard disks, CD-ROM's) can be connected via a 40pole flat ribbon cable. When using two hard disks, one of them must be configured as Master, the other as Slave. Please take details from the Technical Descriptions of the hard disks.

Hint: Before using newly installed IDE drives, the user must first adjust the actually used hard disk types and their operating modes in the Setup.

Attention: If a second IDE controller exists on the ISA96-Bus (for example Filecard, HD-Card), the corresponding internal IDE controller (primary or secondary) on the ISA96 P7/106 must be manually disabled in the Setup!

5.3.1 Connector Assignment of the Standard IDE Interface

S21
40pin Header Row

/RESET	1	2	GND
SD7	3	4	SD8
SD6	5	6	SD9
SD5	7	8	SD10
SD4	9	10	SD11
SD3	11	12	SD12
SD2	13	14	SD13
SD1	15	16	SD14
SD0	17	18	SD15
GND	19	20	
DRQ	21	22	GND
/IOW	23	24	GND
/IOR	25	26	GND
IORDY	27	28	
/DACK	29	30	GND
IRQ15	31	32	
SA1	33	34	
SA0	35	36	SA2
/CS0	37	38	/CS1
/HDLED	39	40	GND

5.4 Serial Interfaces

The ISA96 P7/106 has two serial interfaces with 16Byte FIFO each (16550 compatible). Their controller is placed on the main board of the CPU unit, while the according drivers are displaced to two exchangeable serial driver modules.

Normally, the two serial interfaces are configured in the Setup as COM1/COM2. Should COM1/COM2 however already exist on an external interface card, the two serial interfaces on the ISA96 P7/106 must be manually set in Setup as COM3/COM4. In both cases, the serial interfaces on the ISA96 P7/106 assign interrupt lines INT4 and INT3! Should COM1... COM4 already exist on external interfaces cards, the two serial interfaces on the ISA96 P7/106 must totally be disabled. Also, no further interrupt lines will be assigned.

Please take closer details of the serial driver modules from their according Technical Descriptions. The actual Janich & Klass Price List will advise you which serial driver modules are actually available.

Optionally, the ISA96 P7/106 is also available with a third assembled serial interface. The drivers for this interface are placed on an additional plug-on module, which usually contains also the driver component for a flat panel. The interface can be configured in the Setup as COM1...4, COM7 or COM8, it can use interrupt lines IRQ3/4/5/7/10/11/12, or 15. The interface is available only via an additional module (refer our Price List).

5.5 Connector Assignment of the Parallel Interface

S17

25pole Sub-D Female Connector

/STROBE	1	14	/AUTOFEED
DATA0	2	15	/ERROR
DATA1	3	16	/INIT
DATA2	4	17	/SELECT
DATA3	5	18	GND
DATA4	6	19	GND
DATA5	7	20	GND
DATA6	8	21	GND
DATA7	9	22	GND
/ACK	10	23	GND
BUSY	11	24	GND
PE	12	25	GND
SELECTED	13		

The parallel interface is compatible to ECP, EPP, PS/2, SPP and IEEE1284.

5.6 Monitor

You can connect an analog monitor to the ISA96 P7/106 via the VGA-compatible 15pole HD-female plug on the front panel. The following table shows the pole assignment:

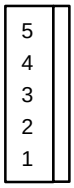
S11
15pole Sub-HD Female Connector

1	Red	75Ω 0,7V
2	Green	75Ω 0,7V
3	Blue	75Ω 0,7V
4	-	
5	Digital-GND	
6	Analog-GND	
7	Analog-GND	
8	Analog-GND	
9	-	
10	Digital-GND	
11	-	
12	DDC-Data	TTL
13	HSYNC	TTL
14	VSYNC	TTL
15	DDC-Clock	TTL

5.7 Connector Assignment of the Keyboard Interface

Built into the front panel of the ISA96 P7/106 is a 6pole mini-DIN female connector where an MF2-compatible keyboard can be connected. The keyboard connection is also available at connector **J2** on the main board. This connector has the following pin assignment:

1 CLOCK
2 DATA
3 N.C.
4 GND
5 +5V



J2

You can connect a key switch to the two-pin header **J3** for locking the keyboard. As soon as the switch closes, the keyboard controller will accept no further enters. This way, the computer can be secured against non allowed usage.

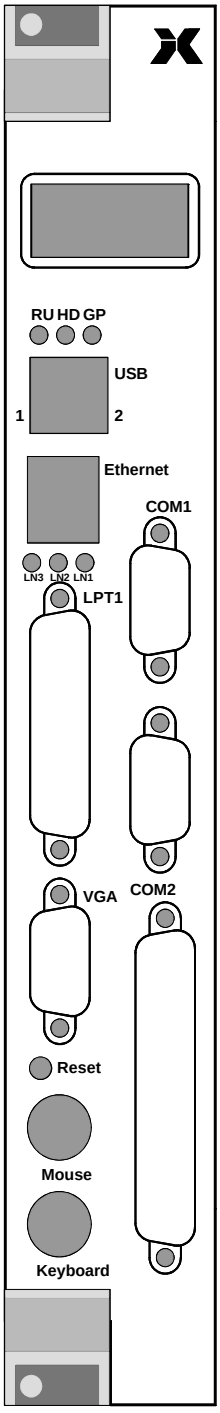
5.8 Plug for Speaker Connection

Any usual speaker of 4...16 Ohm or a Piezo buzzer can be connected to the 4pin header row **S26**.

S26
4pin Header Row

1	2	3	4
SPEAKER		GND	+5V

5.9 Front Panel



6 BIOS

6.1 Power-On-Self-Test

After switching on the ISA96 P7/106, the BIOS effects a self test, the so-called "POST" = Power-On-Self-Test. Eventual errors during this self test will be indicated either by beep codes, or on the screen. An error message may be followed by the query to press the key <F1> to continue, or <DEL> to get into Setup.

Furthermore, special POST codes are put out on the ISA96-Bus to I/O-address 80h, which illustrate the process of the self test. If your ISA96 P7/106 is equipped with an LCD panel, these POST codes will be displayed there, too.

6.1.1 Beep-Codes

Actually, the BIOS has only one single beep code. This code indicates that a video error has happened and that the BIOS can not initialize the panel to indicate further information.

This beep code consists of one **single long** beep, followed by **two short** ones.

6.1.2 Visual Messages on the Screen

"BIOS ROM checksum error - System halted"
The checksum of the BIOS codes in the BIOS-Flash-EPROM is invalid. This means that the BIOS code may be defective. Please address yourself to the Janich & Klass service for exchange of the BIOS chip.

"CMOS Battery failed"
The CMOS battery does no longer function. Please address yourself to the Janich & Klass service for exchange of the battery.

"CMOS checksum error- Defaults loaded"
The check sum of the CMOS is wrong, so that the system loads the defaults. A checksum error might mean that the contents of the CMOS memory have been overwritten. The error might also have been caused by a weak battery. Please check the load condition of the battery and have it exchanged in due case.

"CPU at *nnnn*"
Indicates the clock frequency of the CPU.

"Press ESC to skip memory test"
The user may press the <Esc> key and can thus skip the complete memory test.

"Floppy disk(s) fail"
The BIOS can not find or initialize the floppy controller or the hard disk. Please make sure that the controller is correctly installed. If a floppy controller is used on the ISA96-Bus (e.g. Filecard or FD-Card), the internal controller must be set to "DISABLED" in the Setup. If no diskettes are installed, make sure that the floppy drive choice in the Setup is at "NONE".

"Hard Disk initializing, please wait a moment"
Some hard disks require some seconds for initialization.

"Hard Disk Install Failure"
The BIOS can not find or initialize the hard disk controller or the hard disk drive. Please make sure that the controller is correctly installed. If a hard disk controller is used on the ISA96-Bus (e.g. Filecard or HD-Card), the corresponding internal controller must be set to "DISABLED" in the Setup. If no hard disk drives are installed, make sure that the hard drive choice in the Setup is at "NONE" or "AUTO".

"Hard disk(s) diagnosis fail"
The system may go through special hard disk diagnosis routines. This message will appear as soon as one or several hard disks report an error during diagnosis.

"Keyboard error or no keyboard present"
The BIOS can not initialize the keyboard. Please make sure that the keyboard is correctly connected and that no keys are pressed during the POST. If you want to intentionally configure the system without any keyboard, please set the error-halt-condition in the Setup to "HALT ON ALL BUT KEYBOARD". The BIOS then ignores the missing keyboard during the POST.

"Keyboard is locked out - Unlock the key"
This message usually means that one or several keys were pressed during the keyboard test. Please make sure that nothing lies on the keyboard.

"Memory Test"
This message appears during a complete memory test; the tested memory areas are counted downwards.

"Memory test fail"
If the POST finds an error during the memory test, additional information will appear with details about kind and place of the memory error.

"Override enabled - Defaults loaded"
If the system can not boot with the actual CMOS configuration, the BIOS can overwrite the actual configuration with BIOS default values, which are suited for the most stable basic system operations.

"Press TAB to show POST screen"
If you ISA96 P7/106 displays a logo during booting, instead of the usual BIOS POST displays, you can toggle between the logo and the standard POST displays with the <TAB> key.

"Primary master hard disk fail"
"Primary slave hard disk fail"
"Secondary master hard disk fail"
"Secondary slave hard disk fail"
The BIOS detects an error on the hard disk, which is connected to the stated IDE interface.

6.1.3 POST-Codes

POST Code	Name of the Test	Description
C0	Turn Off Chipset Cache	OEM Specific-Cache control
01	Processor Test 1	Processor Status (1FLAGS) Verification. Tests the following processor status flags: carry, zero, sign, overflow, The BIOS sets each flag, verifies they are set, then turns each flag off and verifies it is off.
02	Processor Test 2	Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FF and 00.
03	Initialize Chips	Disable NMI, PIE, AIE, UEI, SQWV Disable video, parity checking, DMA Reset math coprocessor Clear all page registers, CMOS shutdown byte Initialize timer 0, 1, and 2, including set EISA timer to a known state Initialize DMA controllers 0 and 1 Initialize interrupt controllers 0 and 1 Initialize EISA extended registers.
04	Test Memory Refresh Toggle	RAM must be periodically refreshed in order to keep the memory from decaying. This function assures that the memory refresh function is working properly.
05	Blank video, Initialize keyboard	Keyboard controller initialization.
06	Reserved	
07	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly, detects bad battery.
BE	Chipset Default Initialization	Program chipset registers with power on BIOS defaults.
C1	Memory presence test	OEM Specific-Test to size on-board memory
C5	Early Shadow	OEM Specific-Early Shadow enable for fast boot.
C6	Cache presence test	External cache size detection

POST Code	Name of the Test	Description
08	Setup low memory	Early chip set initialization Memory presence test OEM chip set routines Clear low 64K of memory Test first 64K memory.
09	Early Cache Initialization	Cyrix CPU initialization Cache initialization
0A	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL
0B	Test CMOS RAM Checksum	Test CMOS RAM Checksum, if bad, or insert key pressed, load defaults.
0C	Initialize keyboard	Detect type of keyboard controller (optional) Set NUM_LOCK status.
0D	Initialize Video Interface	Detect CPU clock. Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
0E	Test Video Memory	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
0F	Test DMA Controller 0	BIOS checksum test. Keyboard detect and initialization
10	Test DMA Controller 1	
11	Test DMA Page Registers	Test DMA Page Registers.
12-13	Reserved	
14	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
15	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
17	Test Stuck 8259's Interrupt Bits	Turn off interrupts then verify no interrupt mask register is on.
18	Test 8259 Interrupt Functionality	Force an interrupt and verify the interrupt occurred.
19	Test Stuck NMI Bits (Parity/IO Check)	Verify NMI can be cleared.

POST Code	Name of the Test	Description
1A		Display CPU clock
1B-1E	Reserved	
1F	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests an clear EISA mode flag. Test EISA Configuration Memory Integrity (checksum & communication interface).
20	Enable Slot 0	Initialize slot 0 (System Board).
21-2F	Enable Slots 1-15	Initialize slots 1 through 15.
30	Size Base and Extended Memory	Size base memory from 256K to 640K and extended memory above 1MB.
31	Test Base and Extended Memory	Test base memory from 256K to 640K and extended memory above 1MB using various patterns. NOTE: This test is skipped in EISA mode and can be skipped with ESC key in ISA mode.
32	Test EISA Extended Memory	If EISA Mode flag is set then test EISA memory found in slots initialization. NOTE: This test is skipped in ISA mode and can be skipped with ESC key in EISA mode.
33-3B	Reserved	
3C	Setup Enabled	
3D	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
3E	Setup Cache Controller	Initialize cache controller.
3F	Reserved	
BF	Chipset Initialization	Program chipset registers with Setup values
40		Display virus protect disable or enable
41	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.
42	Initialize Hard Drive & Controller	initialize hard drive controller and any drives.
43	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
44	Reserved	
45	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
46	Reserved	
47	Reserved	

POST Code	Name of the Test	Description
48-4D	Reserved	
4E	Manufacturing POST Loop or Display Messages	Reboot if Manufacturing POST Loop pin is set. Otherwise display any messages (i.e., any non-fatal errors that were detected during POST) and enter Setup.
4F	Security Check	Ask password security (optional).
50	Write CMOS	Write all CMOS values back to RAM and clear screen.
51	Pre-boot Enable	Enable parity checker Enable NMI, Enable cache before boot.
52	Initialize Option ROMs	Initialize any option ROMs present from C8000h to EFFFFh. NOTE: When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
53	Initialize Time Value	Initialize time value in 40h: BIOS area.
60	Setup Virus Protect	Setup virus protect according to Setup
61	Set Boot Speed	Set system speed for boot
62	Setup NumLock	Setup NumLock status according to Setup
63	Boot Attempt	Set low stack Boot via INT 19h.
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display **Press F1 to disable NMI, F2 reboot**.
E1-EF	Setup Pages	E1- Page 1, E2 - Page 2, etc.
FF	Boot	

6.2 Setup

```
                    ROM PCI/ISA BIOS (2A5KKJG0)
                       CMOS SETUP UTILITY
                     AWARD SOFTWARE, INC.

    STANDARD CMOS SETUP              INTEGRATED PERIPHERALS
    BIOS FEATURES SETUP              SPECIAL FEATURES SETUP
    CHIPSET FEATURES SETUP           PASSWORD SETTING
    POWER MANAGEMENT SETUP           IDE HDD AUTO DETECTION
    PNP/PCI CONFIGURATION            SAVE & EXIT SETUP
    LOAD BIOS DEFAULTS               EXIT WITHOUT SAVING
    LOAD SETUP DEFAULTS

Esc : Quit                                  : Select Item
F10 : Save & Exit Setup              (Shift)F2 : Change Color
```

This is the start page of the Setup integrated in the BIOS. From here on, you can get to the different sub-pages of the Setup, or also finish the Setup. The following possibilities are at your choice:

Standard CMOS Setup
On this sub-page, you can, among others, set the date, the time, and the kind of connected hard disk drives.

BIOS Features Setup
Different BIOS options can be set on this sub-page.

Chipset Features Setup
The settings on this sub-page concern the chip set of the P7/106 and should normally not be modified.

Power Management Setup
On this sub-page, different Power Save Options can be set.

PNP/PCI Configuration
This sub-page serves for controlling the Plug&Play mechanisms of the BIOS.

Load BIOS Defaults
With this menu item, you can reset all Setup settings to a condition with which the P7/106 can safely boot in any case.

Load Setup Defaults
With this menu item, you can reset all Setup settings to their factory setting.

Integrated Peripherals
On this sub-page, you can modify the settings for the standard interfaces (IDE, FDC, USB, COM, LPT).

Special Features Setup
The additional hardware components of the P7/106 (Silicon-Disk, COM3, LM78) can be configured on this sub-page.

Password Setting

In order to protect the BIOS Setup respectively the complete system from unauthorized access, you can assign a password in this menu item. A once activated password is deactivated again by just pressing the <Return> key during this menu, instead of inserting a new password.

IDE HDD Auto Detection

With this Setup sub-page, you can have the BIOS search for connected IDE hard disk drives.

Save & Exit Setup

This menu item finalizes the Setup and saves all eventually made modifications.

Exit without Saving

This menu item finalizes the Setup without saving eventually made modifications.

```
                    ROM PCI/ISA BIOS (2A5KKJG0)
                        STANDARD CMOS SETUP
                      AWARD SOFTWARE, INC.

    Date (mm:dd:yy) : Thu, Feb  4 1999
    Time (hh:mm:ss) : 14 : 48 : 48

    HARD DISKS         TYPE    SIZE   CYLS HEAD PRECOMP LANDZ SECTOR  MODE


    Date (mm:dd:yy) : Thu, Feb  4 1999
    Time (hh:mm:ss) : 14 : 48 : 48

    HARD DISKS         TYPE    SIZE   CYLS HEAD PRECOMP LANDZ SECTOR  MODE
    ------------------------------------------------------------------------
    Primary Master   : AUTO       0      0    0       0     0       0  AUTO
    Primary Slave    : AUTO       0      0    0       0     0       0  AUTO
    Secondary Master : AUTO       0      0    0       0     0       0  AUTO
    Secondary Slave  : AUTO       0      0    0       0     0       0  AUTO

    Drive A : 1.44M, 3.5 in.              Base Memory:    640K
    Drive B : None                    Extended Memory:  64512K
                                         Other Memory:    384K
    Video   : EGA/VGA                    ------------------------
    Halt On : All Errors                    Total Memory:  65536K

ESC : Quit                        : Select Item       PU/PD/+/- : Modify
F1  : Help                (Shift)F2 : Change Color
```

Date: Please set the actual date here. You may use the standard digit keys, however not the numeric keypad.

Time: Please set the actual time here. You may use the standard digit keys, however not the numeric keypad.

Primary Master / Primary Slave:
Secondary Master / Secondary Slave:

Type:

"Auto" This is the recommended setting for "Type". The BIOS automatically reads the parameters from the hard disk and enters them into the following columns.

"None" Please select this setting if no hard disk or CD-ROM is connected to the corresponding IDE port.

"User" With this setting, you can enter the hard disk parameters by yourself into the corresponding columns.

Mode:

"Auto": This is the recommended setting for "MODE". The BIOS automatically reads the parameter from the hard disk and sets the correct mode.

"Normal": This setting should be used only if the hard disk was formatted with an older Janich & Klass CPU unit. The Normal mode indicates the actual number of cylinders, heads, and sectors for the hard disk, but due to the limitation to 1024 cylinders the operating system will see only 528MB of the hard disk size.

"LBA": LBA is a translation mode. You may wonder why the cylinders are divided by 2 or 4, and the heads are multiplied with 2 or 4. If the hard disk has 850MB, the cylinders are divided by 2, and the heads are multiplied with 2. At hard

disks above 1,0GB, the cylinders are divided by 4 and the heads multiplied with 4. LBA modifies the number of cylinders and heads in a way that the sector limit of the BIOS are omitted - i.e. 63 sectors per track, 1024 tracks and 255 heads. LBA "fixes" the BIOS force to 1024 cylinders. The LBA mode keeps the number of cylinders below 1024. So, if a hard disk has 2484 cylinders and 16 heads, LBA makes it look for the BIOS as if the hard disk had only 621 cylinders and 64 heads.

"Large": The Large mode is not used very often. It works with a few systems, however not with most of them. It was a first trial at LBA. We recommend not to use Large at all.

Drive A / B: Please set your type of connected diskette here.

Video: Please always set to "EGA/VGA". Exception: You use an MGA card and want the P7/106 to boot with this card. Only in this case, please set to "mono".

Halt On: With this menu item, you can determine at which error kinds the BIOS shall halt the Power-On self test and shall give an error report. The error report is followed by the query to press the <F1> key for continuation, or <DEL> for reaching the Setup.

```
                    ROM PCI/ISA BIOS (2A5KKJG0)
                        BIOS FEATURES SETUP
                       AWARD SOFTWARE, INC.

CPU Internal Cache          : Enabled     Video  BIOS Shadow  : Enabled
 External Cache             : Enabled     C8000-CBFFF Shadow  : Disabled
 Quick Power On Self Test   : Enabled     CC000-CFFFF Shadow  : Disabled
 Boot Sequence              : C,A,SCSI    D0000-D3FFF Shadow  : Disabled
 Swap Floppy Drive          : Disabled    D4000-D7FFF Shadow  : Disabled
 Boot Up Floppy Seek        : Enabled     D8000-DBFFF Shadow  : Disabled
 Boot Up NumLock Status     : On          DC000-DFFFF Shadow  : Disabled
 Gate A20 Option            : Fast
 Typematic Rate Setting     : Disabled


 Security Option            : Setup
 PS/2 mouse function control: Enabled
 PCI/VGA palette Snoop      : Disabled
 Assign IRQ for VGA         : Enabled     ESC : Quit              : Select Item
 OS Select For DRAM > 64MB  : Non-OS2     F1  : Help        PU/PD/+/- : Modify
 Report No FDD For WIN 95   : Yes         F5  : Old Values  (Shift)F2 : Color
                                          F6  : Load BIOS  Defaults
                                          F7  : Load Setup Defaults
```

CPU Internal Cache / External Cache

A Cache memory is an additional memory which is decisively faster than the main memory. If the CPU queries data, the system delivers the queried date from the main memory into the Cache memory, for even faster access by the CPU.

Quick Power On Self Test

Set to "Enabled" in order to reduce the time for the Power On Self Test (POST). A Quick POST will skip certain steps. We recommend to normally disable the Quick POST. It is better to find a problem during POST than to loose data during operation.

Boot Sequence

Here you can determine in which sequence the BIOS shall search the connected hard disks (FD's, HD's, CD-ROM's) for a bootable operating system.

Swap Floppy Drive

This field is effective only in systems with two diskette drives. "Enabled" assigns the physical drive B with the logical hard disk letter A, and the physical drive A becomes the logical drive B.

Boot Up Floppy Seek

When set to "Enabled", the BIOS tests the diskettes for determining whether they have 40 or 80 tracks. Only 360KB diskettes have 40 tracks; all drives with 720KB, 1,2MB and 1,44MB have 80 tracks. As practically no 40-track diskettes exist any more, we recommend to set this field to "Disabled" in order to save time.

Boot Up NumLock Status

This menu item checks the condition of the NumLock key on the keyboard after system boot. When set to "On", the numeric keypad generates numbers instead of cursor commands.

Gate A20 Option

"Gate A20" relates to the way how the ISA96 P7/106 addresses memories above 1MB (extended memory). When set to "Fast", the chipset controls the "Gate A20". At "Normal", a pin in the keyboard controller controls the "Gate A20". Setting Gate A20 to "Fast" will raise the system speed, specially at OS/2 and Windows. "Fast" is default setting.

Typematic Rate Setting

At "Disabled", the two following items (Typematic Rate and Typematic Delay) are irrelevant. Key strokes repeat at a rate determined by the keyboard controller of the ISA96 P7/106.
When "Enabled", you can select between Typematic Rate and Typematic Delay.

Typematic Rate (Chars/Sec)

If "Enabled" was selected at menu item "Typematic Rate Setting", you can set a Typematic Rate (the rate at which characters repeat when a key is pressed down) of 6, 8, 10, 12, 15, 20, 24 or 30 characters per second.

Typematic Delay (msec)

If "Enabled" was selected at menu item "Typematic Rate Setting", you can set a Typematic Delay (the delay before key strokes begin to repeat) of 250, 500, 750 or 1000 milliseconds.

Security Option

If you have a password, select whether the password is required every time the system boots, or only when you enter BIOS-Setup.

PS/2 Mouse Function Control

Select "Disabled", if you want to disable the PS/2 mouse interface of the ISA96 P7/106 (e.g. if you have installed a serial mouse).

PCI/VGA Palette Snoop

Please always set this field to "Disabled".

OS Select for DRAM > 64MB

Please select "OS2" here only if you are running operation system OS/2 with greater than 64MB DRAM on the ISA96 P7/106.

Shadow

"Shadowing" copies the contents of the BIOS extension ROM on the ISA96-Bus into the SDRAM main memory, where the CPU can read it much faster than via the relatively slow ISA96-Bus. Shadowing thus improves the capacity of BIOS extensions, but it also reduces the amount of high memory (640KB to 1MB) available for loading device drivers, etc.
Enable Shadowing into each section of memory separately. Video-BIOS shadowing is generally activated on the ISA96 P7/106; the memory area is C0000-CBFFF (48KByte). The remaining areas which are displayed on this Setup page can be assigned by firmware of other ISA96 cards. If an ISA96 card within your system contains a BIOS extension ROM, you must know the address area assigned by the ROM in order to activate the correct Shadowing area in the BIOS Setup.

```
ROM PCI/ISA BIOS (2A5KKJG0)
   CHIPSET FEATURES SETUP
    AWARD SOFTWARE, INC.
```

Auto Configuration	: Enabled	Current System Temp.	: 27 C
L2 TAG RAM Size	: 8	CPU temperature	: 43 C
AT Bus Clock	: CLK2/3	Current CPUFAN1 Speed	: 5037 RPM
DRAM Timing	: Normal	Power Intern VCORE	: 2.20V
SDRAM CAS Latency	: 3	Power Intern +3.3V	: 3.30V
Pipelined Function	: Enabled	Power Supply +5V	: 5.00V
Graphics Aperture Size	: 64 MB	Power Supply +12V	: 12.00V
DRAM Data Integrity Mode	: Disabled	Power Supply -12V	:-12.00V
Memory Hole At 15-16M	: Disabled		
Host Read DRAM Command Mode	: Bypass		
AGP Read Burst	: Enabled		
ISA Line Buffer	: Enabled		
Passive Release	: Enabled		
Delay Transaction	: Disabled		
Primary Frame Buffer	: All		
VGA Frame Buffer	: Enabled		
Data Merge	: Disabled	ESC : Quit	: Select Item
IO Recovery Period	: 1 us	F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values	(Shift)F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

The settings on this sub-page concern the chipset of the P7/106 and should normally not be modified.

Auto Configuration

Auto Configuration selects predetermined optimal values for the chipset parameters. When "Disabled", chipset parameters revert to Setup information stored in the CMOS. Many fields in this screen may not be available if Auto Configuration is "Enabled".

AT-BUS Clock

You can set the clock frequency for the ISA96-Bus in terms of a fraction of the 33MHz clock speed, or at the fixed speed of 7,16MHz.

DRAM Data Integrity Mode

Select "Parity", "ECC" (Error-Correcting Code) or "disabled", according to the type of installed DRAM.

ISA Line Buffer

The M1543C PCI-to-ISA Bridge has a bi-directional 8Byte line buffer for ISA- or DMA-busmaster memory reads from or writes to the PCI-Bus. When "Enabled", an ISA- or DMA busmaster can prefetch two double words to the line buffer for a read cycle.

Passive Release

When "Enabled", accesses of the CPU to the PCI-Bus are allowed during passive release. Otherwise, the arbiter only allows another PCI master access to the local DRAM.

Delay Transaction

The M1543C PCI-to-ISA bridge has an embedded 32Bit "Posted Write Buffer" to support delay transaction cycles. Select "Enabled" to support compliance with the PCI specification, Rev. 2.1.

Primary Frame Buffer

Select a size for your PCI frame buffer. The size of the buffer should not impinge on local memory.

VGA Frame Buffer

When "Enabled", a fixed VGA frame buffer from A0000h to BFFFFh and a CPU-to-PCI write buffer are implemented.

Attention: Please make sure that all menu items which are not listed here are set exactly as shown in the above illustration.

```
                    ROM PCI/ISA BIOS (2A5KKJG0)
                      POWER MANAGEMENT SETUP
                       AWARD SOFTWARE, INC.

ACPI Function      : Disabled
Power Management   : User Define
PM Control by APM  : Yes
MODEM Use IRQ      : 3
Video Off Option   : Susp,Stby -> Off
Video Off Method   : DPMS Support

       ** PM Monitor **
HDD Power Down     : Disable
Doze Mode          : Disable
Standby Mode       : Disable
Suspend Mode       : Disable

        ** PM Events **
Primary HDD        : Disabled
Floppy             : Disabled
COM Ports          : Disabled
Keyboard           : Disabled
LPT Ports          : Disabled

ESC : Quit              : Select Item
F1  : Help        PU/PD/+/- : Modify
F5  : Old Values  (Shift)F2 : Color
F6  : Load BIOS  Defaults
F7  : Load Setup Defaults
```

Different options for power saving can be set on this sub-page.

Power Management

This menu allows you to configure the power saving modes "Doze", "Standby", and "Suspend". Please also refer chapter "PM Timers" for a short description of each of these modes.

This overview describes each Power Management Mode:

"Max Saving"	Maximum power saving. Only available for SL CPUs. Inactivity period is 1 minute in each mode.
"User Define"	Set each mode individually. Each inactivity period may be set between 1 minute and 1 hour. Select the inactivity periods in menu "PM Timers", refer below.
"Min Saving"	Minimum saving. The inactivity period is 1 hour in each mode.

PM Control by APM

If Advanced Power Management (APM) is installed in your system, please select "Yes" for improved power saving.

Video Off Option

Select the power saving modes during which the monitor goes blank:

"Always on"	Monitor remains on during all power-saving modes.
"Suspend Off"	Monitor goes blank as soon as the system goes into suspend mode.
"Susp,Stby Off"	Monitor goes blank as soon as the system goes into Suspend-or Standby mode.
"All Modes Off"	Monitor goes blank as soon as the system goes into any power saving mode.

Video Off Method

Determines the manner in which the monitor is blanked.

"V/H SYNC+Blank"	System turns off signals for vertical and horizontal synchronization and writes blanks to the video buffer.
"DPMS Support"	Select this option if your monitor supports the "Panel Power Management Signaling" (DPMS) Standard.

"Blank Screen" System only writes blanks to the video buffer.

PM Monitor

The following modes are power saving functions. Doze, Standby and Suspend modes are user-configurable only during Defined Power Management mode.

HDD Power Down

After the defined period of drive inactivity, the hard disk drive powers down while all other devices remain active. Control of this mode is independent of the Power Management Mode selected previously.

Doze Mode

After the defined period of system inactivity, the CPU clock runs at slower speed while all other devices still operate at full speed.

Standby Mode

After the defined period of system inactivity, the hard disk drive and the video controller shut off while all other devices still operate at full speed.

Suspend Mode

After the defined period of system inactivity, all devices except the CPU shut off.

PM Events

You can disable activity monitoring of some devices so that these devices do not wake up the system. The default wake-up event is keyboard activity.

Primary HDD

When "On", any hard disk activity wakes up the system.

Floppy

When "On", any floppy drive activity wakes up the system.

COM Ports

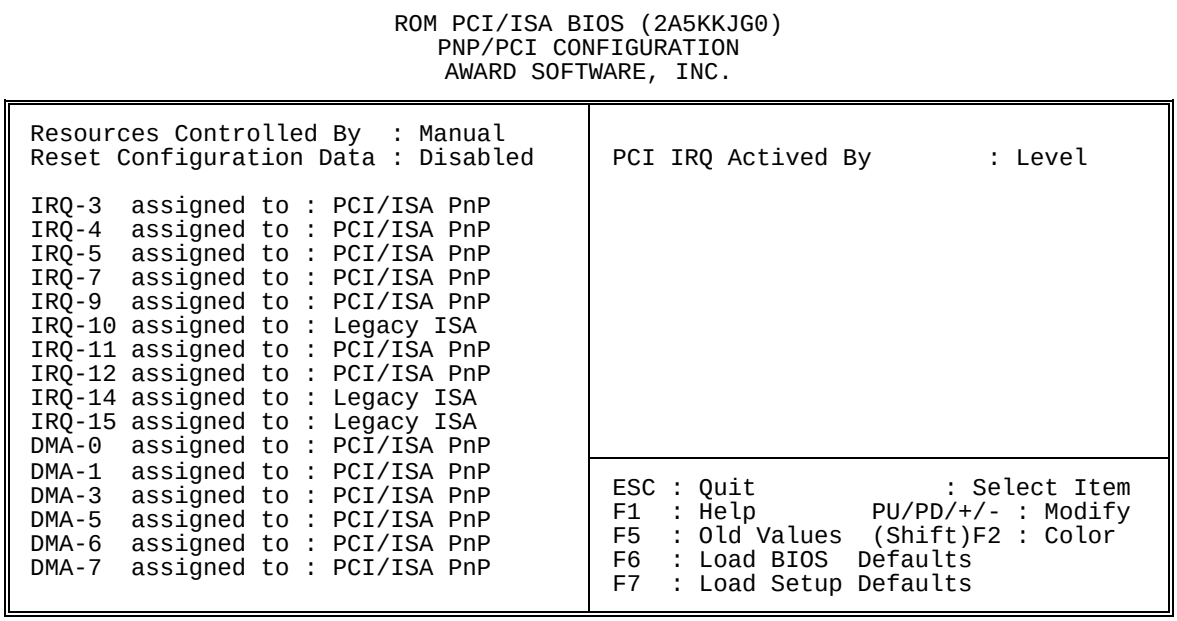
When "On", any COM port wakes up the system when receiving a character.

Keyboard

When "On", any keyboard activity wakes up the system.

LPT Ports

When "On", any output of a character to the printer wakes up the system.


ROM PCI/ISA BIOS (2A5KKJG0)
PNP/PCI CONFIGURATION
AWARD SOFTWARE, INC.
Resources Controlled By : Manual
Reset Configuration Data : Disabled
IRQ-3 assigned to : PCI/ISA PnP
IRQ-4 assigned to : PCI/ISA PnP
IRQ-5 assigned to : PCI/ISA PnP
IRQ-7 assigned to : PCI/ISA PnP
IRQ-9 assigned to : PCI/ISA PnP
IRQ-10 assigned to : Legacy ISA
IRQ-11 assigned to : PCI/ISA PnP
IRQ-12 assigned to : PCI/ISA PnP
IRQ-14 assigned to : Legacy ISA
IRQ-15 assigned to : Legacy ISA
DMA-0 assigned to : PCI/ISA PnP
DMA-1 assigned to : PCI/ISA PnP
DMA-3 assigned to : PCI/ISA PnP
DMA-5 assigned to : PCI/ISA PnP
DMA-6 assigned to : PCI/ISA PnP
DMA-7 assigned to : PCI/ISA PnP
PCI IRQ Actived By : Level
ESC : Quit : Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift)F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

This sub-page serves for configuring the Plug&Play mechanisms of the BIOS'.

Resources Controlled By

The Plug and Play BIOS of the ISA96 P7/106 can automatically configure all boot- and Plug and Play compatible devices. If you select "Auto", all fields for Interrupt Request (IRQ) and DMA fields disappear, as BIOS automatically assigns those.

Reset Configuration Data

Normally, you leave this field "Disabled". Select "Enabled" to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on device and the system reconfiguration has caused such a serious conflict that the operating system cannot boot.

IRQ *n* Assigned to

When resources are controlled manually (refer above), select one of the following types for each system interrupt, according to the type of device that uses the interrupt:

"Legacy ISA" Devices compliant with the original-PC-AT-Bus specification requiring a special interrupt (usually all ISA96-I/O devices).

"PCI/ISA PnP" All IRQ's which are not firmly assigned by certain devices should be left at this setting to enable BIOS to correctly configure Plug & Play devices.

DMA *n* Assigned to

If resources are controlled manually (refer above), select for each system DMA channel one of the following types, according to the type of device using the DMA channel:

"Legacy ISA" Devices which accord with the original PC-AT-Bus specification and require a special DMA channel.

"PCI/ISA PnP" All DMA channels which are not firmly assigned by certain devices, should be left at this setting, to enable BIOS to correctly configure Plug & Play devices.

PCI IRQ Activated by

Leave the IRQ trigger at "Level", except for the case that the PCI device that assigns the interrupt, specifies "Edge "triggered interrupts.

```
                    ROM PCI/ISA BIOS (2A5KKJG0)
                       INTEGRATED PERIPHERALS
                        AWARD SOFTWARE, INC.

IDE HDD Block Mode         : Enabled      KBC clock source           : 8 MHz
                                          Onboard FDC Controller     : Enabled
 On-Chip Primary IDE       : Enabled      Onboard UART Port 1        : 2F8/IRQ3
  Master PIO               : Auto         Onboard UART Port 2        : 3F8/IRQ4
  Slave  PIO               : Auto
  Master Ultra DMA         : Auto
  Slave  Ultra DMA         : Auto         Onboard Parallel Port      : 378/IRQ7
                                          Parallel Port Mode         : ECPEPP1.9
 On-Chip Secondary IDE     : Enabled      ECP Mode Use DMA           : 3
  Master PIO               : Auto
  Slave  PIO               : Auto
  Master Ultra DMA         : Auto
  Slave  Ultra DMA         : Auto

 On-Chip USB Controller    : Enabled
  USB Keyboard Support     : Disabled     ESC : Quit              : Select Item
                                          F1  : Help        PU/PD/+/- : Modify
 Init Display First        : AGP          F5  : Old Values  (Shift)F2 : Color
                                          F6  : Load BIOS  Defaults
                                          F7  : Load Setup Defaults
```

On this Setup page, the standard periphery of the ISA96 P7/106 can be configured.

On chip Primary IDE:

"enabled" You must select this setting if the internal 2,5" hard disk of the ISA96 P7/106 shall be used. No further primary hard disk (Filecard or HD-Card) may be put on the ISA96-Bus! The following four menu items should all be at "Auto".

"disabled" You must select this setting, if a primary hard disk (Filecard or HD-Card) shall be used on the ISA96-Bus. In this case, the internal 2,5" hard disk of the ISA96 P7/106 is shut off.

On chip Secondary IDE:

"enabled" You must select this setting, if you have connected an IDE drive (hard disk or CD-ROM) to the 40pin header row S21. No further secondary drive (Filecard or HD-Card) may be put on the ISA96-Bus! The following four menu items should all be at "Auto".

"disabled" You must select this setting, if a secondary drive (Filecard or HD-Card) shall be used on the ISA96-Bus. In this case, you cannot use the IDE port at header row S21.

On chip USB Controller:

In order to use the two USB interfaces of the ISA96 P7/106, you have to set this menu item to "enabled".

Onboard FDC Controller:

"enabled" You must select this setting, if you have connected a diskette drive to the 34pin header row S24. No further floppy controller (Filecard or FD-Card) may be put on the ISA96-Bus!

"disabled" You must select this setting, if a diskette drive (Filecard or FD-Card) shall be used on the ISA96-Bus. In this case, you cannot use the floppy connection at header row S24.

Onboard UART Port 1/2:

These menu items serve for determination of the addresses and interrupt lines for the first two serial interfaces. The following settings are possible: "3F8/IRQ4" (COM1), "2F8/IRQ3" (COM2), "3E8/IRQ4" (COM3), "2E8/IRQ3" (COM4) and "Auto". The interfaces can also be completely shut off by pressing the <+> key as often until "disabled" appears in these fields.

Onboard Parallel Port:

This menu item serves for determination of the address and the interrupt line for the parallel interface. The following settings are possible: "378/IRQ7" (LPT1), "278/IRQ5" (LPT2), "3BC/IRQ7" (LPT3) and "Auto". The interface can also be completely shut off by pressing the <+> key as often until "disabled" appears in these fields.

Parallel Port Mode:

Please set the desired mode for the parallel interface here.

Attention: Please make sure that all menu items which are not listed here remain as shown in the above illustration.

```
                ROM PCI/ISA BIOS (2A5KKJG0)
                  SPECIAL FEATURES SETUP
                   AWARD SOFTWARE, INC.

    ** On-Board Static RAM **          |     ** On-Board UART Port 3
Configuration    : switched            | I/O Adress       : 3E8h (COM3)
SRAM Access      : read/write          | Interrupt Line   : IRQ10
                                       |
                                       | IRQ12 Routing    : PS/2-Mouse
    ** On-Board Flash-Disc **          |
Memory Address   : D4000h              |
I/O Address      : 360h                |
                                       |
    ** On-Board Socket EP1 **          |
Memory Address   : D800h               |
                                       |
        ** Watchdog **                 |
Watchdog Timeout : disabled            |
                                       |
                                       | ESC : Quit              : Select Item
   ** On-Board VGA Start Up **         | F1  : Help        PU/PD/+/- : Modify
Display on       : LCD, if no CRT      | F5  : Old Values  (Shift)F2 : Color
                                       | F6  : Load BIOS  Defaults
                                       | F7  : Load Setup Defaults
```

On this Setup page, the additional functions of the ISA96 P7/106 can be configured.

On-Board Static RAM:

Configuration:

"linear": The additional SCRAM can be used as "normal" memory in the address area CC000h ... EFFFFh (start address and size: refer below).

"switched": The additional SCRAM is arranged to the "On-Board Flash-Disk" (refer below).

"disabled": The SCRAM is shut off.

SRAM Access:

"read/write": The additional SCRAM can be read from and written to.

"read/only": The additional SCRAM is write-protected.

SRAM Size:

If the field "Configuration" is at "linear", the size of the additional SCRAM can be set here between 16KByte and 128KByte.

Memory Address:

If the field "Configuration" is at "linear", the start address of the additional SCRAM can be set here in steps of 16KByte.

On-Board Flash-Disk:

Memory Address:

Here, you can set the memory start address of the Flash-Disk (EPROM-Disk) in steps of 16KByte, if it is assembled. The size of the Flash-Disk in the memory address area is always 16KByte. The Flash-Disk can also be shut off completely by pressing the <+> key as often until "disabled" appears in this field.

I/O Address:

Here, the I/O-Start address of the Flash-Disk (EPROM-Disk) can be set, if it is assembled. The size of the Flash-Disk in the I/O-address area is always 2Byte.

Watchdog:

Watchdog Timeout:

"0,25s" ... "32,2s": This is the Watchdog time constant. The user program must periodically trigger the Watchdog, where the period length must be shorter than the time set here. In order to allow the system to boot, the Watchdog becomes active only after the first trigger.

"disabled": The Watchdog is disabled.

On-Board VGA Start Up:

Display on:

Here you set with which monitor (flat panel or analogous monitor) the system shall start. The following settings are possible:

"LCD, if no CRT": Start with the flat panel, if no analogous monitor is connected.

"Force CRT": Always start with the analogous monitor.

"Simultaneous": Always start in simultaneous mode (both monitors at a time).

On-Board Socket EP1:

Memory Address:

Here, the memory start address of the memory module ("Disc-On Chip") in socket "EP1" can be set in steps of 16KByte, if it is assembled. The size of the memory module in the memory address area is always 16KByte. The memory module can also be completely shut off by pressing the <+> key as often until "disabled" appears in this field.

On-Board UART Port 3:

I/O Address:

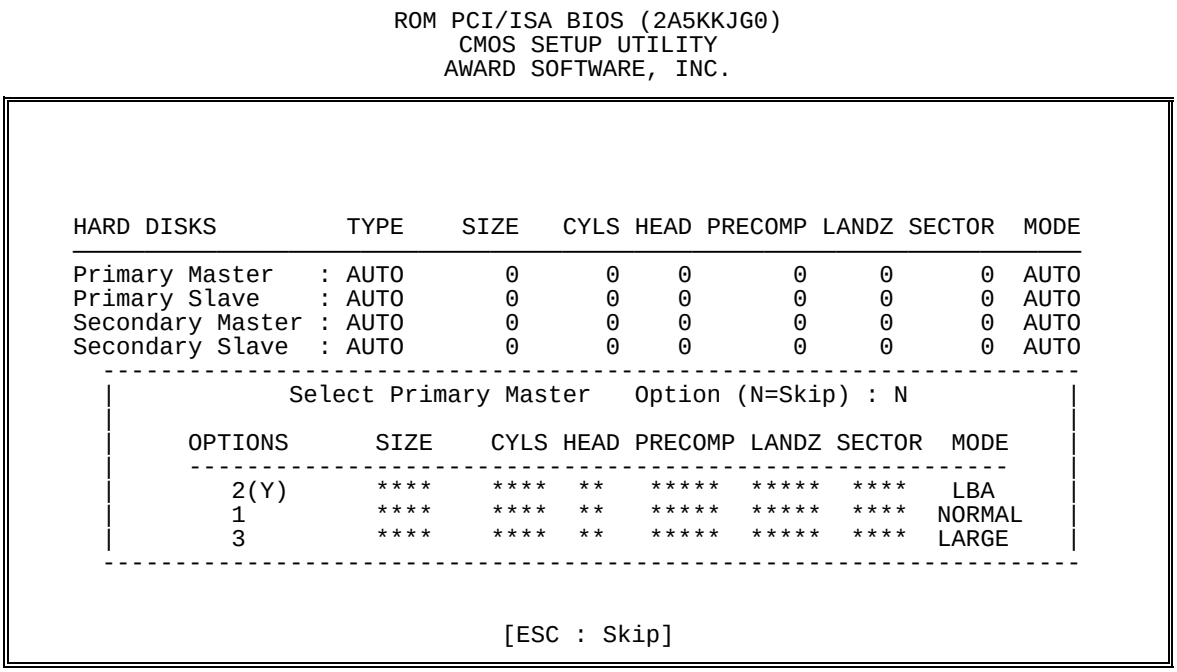
Here, the I/O start address of the 3rd serial interface can be set, if it is assembled. Possible settings are "COM1"..."COM4", "COM7" or "COM8". The 3rd serial interface can also be completely shut off by pressing the <+> key as often until "disabled" appears in this field.

Interrupt Line:

Here, one can select the interrupt line for the 3rd serial interface. Possible settings are IRQ3/4/5/7/10/11/12 or 15.

IRQ12-Routing:

If a PS/2 mouse shall be used, you must set "PS/2-Mouse" here. The line IRQ12 on the ISA96-Bus is then no longer available! If you do not use a PS/2 mouse, you should set "ISA96 Bus" here, so that the line IRQ12 can be used on the ISA96-Bus by periphery cards.


ROM PCI/ISA BIOS (2A5KKJG0)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
HARD DISKS TYPE SIZE CYLS HEAD PRECOMP LANDZ SECTOR MODE
Primary Master : AUTO 0 0 0 0 0 0 AUTO
Primary Slave : AUTO 0 0 0 0 0 0 AUTO
Secondary Master : AUTO 0 0 0 0 0 0 AUTO
Secondary Slave : AUTO 0 0 0 0 0 0 AUTO
Select Primary Master Option (N=Skip) : N
OPTIONS SIZE CYLS HEAD PRECOMP LANDZ SECTOR MODE
2(Y) **** **** ** ***** ***** **** LBA
1 **** **** ** ***** ***** **** NORMAL
3 **** **** ** ***** ***** **** LARGE
[ESC : Skip]

With this Setup page, you can have the BIOS search for connected IDE hard disk drives. For recognized hard disks, their hard disk parameters are displayed. Furthermore, you can set the mode to be used.

Normally, you should however not use this page, but instead set the fields "TYPE" and "MODE" to "AUTO" in setup page "Standard CMOS Setup".

6.3 BIOS Update

You can re-program the BIOS-Flash-EPROM using the program "AWDFLASH.EXE" (please refer to the ISA96-CD). This enables you to make BIOS updates anytime without de-installing the card. On program start, user hints are displayed. You should by all means use the offered opportunity to save the old BIOS version to diskette! This will put you in a position to restore the old condition before the update, for the case that the new BIOS should not function as desired.

The actual BIOS version is placed in our Mailbox.

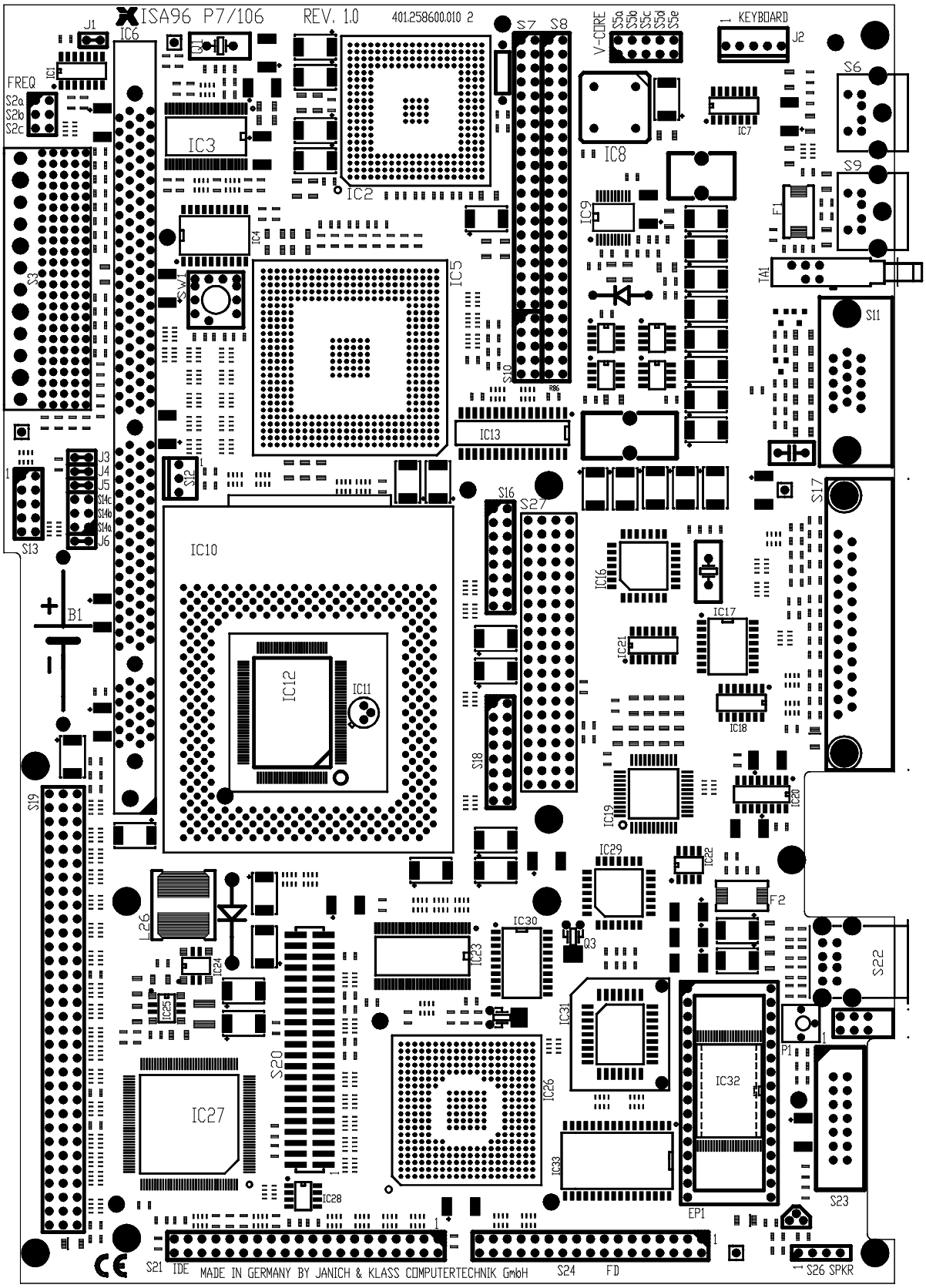
7 Technical Data

Dimensions:	233,4mm * 160mm * 40mm
Design:	8 layer board FR4 with solder mask and position print. All connectors are gold-plated.
Installation:	preferably upright with 5mm distance to the assembled side.
Cooling:	at upright installation convection cooling with at least 1m/min air speed.
Power consumption:	4A typical at 5V; 300mA maximal at ±12V.

8 Environment Conditions

Supply Voltages:	+4,75V ... +5,25V, max. 100mV Vss Ripple. +11,4V ... +12,6V, max. 300mV Vss Ripple. -11,4V ... -12,6V, max. 300mV Vss Ripple.
Operating Temperature:	+5 ... +55 °C.
Storage Temperature:	-40 ... +85 °C.
Relative Humidity:	10 - 90% non-condensing.
Storage Period:	unlimited.

9 Position Print



10 Appendix

10.1 Good to Know

10.1.1 External/Internal Floppy and IDE Drives

The P7/106 has two IDE controllers and a floppy controller, which here are called "internal" controllers, as they are integrated to the chip set of the board. The secondary IDE and the floppy interface of these controllers is accessed via a 40pin and a 34pin header row where standard flat ribbon cables can be connected. The Primary IDE interface is foreseen exclusively for an internal 2,5" harddisk which is directly mounted on top of the P7/106.

Besides the internal floppy and IDE controllers, also "external" controllers can be used for the ISA96 / AT96-Bus. Janich & Klass offers such componentries, for example under the names: ISA96 Filecard (6U, 8HP, floppy and harddisk), ISA96 HD-Card (3U, 4HP, harddisk) and ISA96 FD-Card (3U, 8HP, floppy). The advantage of such cards is their service friendliness, as they can very easily be built in and out. Of disadvantage, however, concerning the IDE controllers is their restricted performance due to the ISA-Bus.

If such external IDE or floppy controllers are applied, the corresponding internal controller of the P7/106 must be disabled in the BIOS-Setup (Submenu "INTEGRATED PERIPHERALS").

Keyword boot sequence: If several harddisks are installed in the system, they are handled by the BIOS of the P7/106 with the following priority concerning the boot drive and the assignment of drive letters:
Prim. IDE Master (C) -> Prim. IDE Slave (D) -> Sec. IDE Master(E) -> Sec. IDE Slave (F). If you have, for example, a harddisk as Prim. IDE Slave and a second as Sec. IDE Master, booting will be affected from the Prim. IDE Slave as drive C as default. The other harddisk operates as drive D (only one partition per disk presumed). But this setting can be modified by the menu item "Boot Sequence" in the sub-menu "BIOS FEATURES SETUP". If you select, for example, the setting "D, A, SCSI", booting will be affected from the (in reality) harddisk D (here Sec. IDE Master) as drive C.

10.1.2 Requirements to 5V Supply

The P7/106 requires 3 different supply voltages: +5V, +12V and -12V. The -12V supply is required only if serial modules RS232C-Standard shall be used. The +12V supply is also used for the CPU fan. But both supply voltages are uncritical concerning their current capacity (<150mA) and voltage stability.

Please turn your special attention to the +5V supply. The P7/106 has, on this supply voltage, a power consumption of up to 4A, depending on the actual type of CPU and memory. Furthermore, considerably load fluctuations may happen, depending on the program.

The P7/106 contains a component which keeps the board in Reset as long as the +5V supply on the card does not surpass a voltage of 4,67V. This means that also short-term voltage failures of the 5V supply during operation of the card will reset it!

This results in the requirement to the +5V-supply on the ISA96 / AT96-Bus that it has to grant sufficient voltage stability at high current load and also at strong/fast load fluctuations. These requirements concern not only to the power supply, but also the wiring between power supply and backplane, and all according connectors. The connecting cables should be as short as possible. If the used power supply has so-called "Sense" inputs, they should be all means be used. These Sense inputs affect that the actual voltage on the backplane is re-fed via additional lines. The output voltage is re-adjusted directly at the power supply, what will compensate an eventual voltage drop via connecting lines and connectors.

Checking the supply voltages is possible at the P7/106 directly in the BIOS-Setup: The actual supply voltages are displayed in the sub-menu "CHIPSET FEATURES SETUP". The value for the +5V supply should preferably not surpass 4,90V. In case of doubt, it is better to set the voltage too high (5,1V - 5,2V).

10.1.3 USB-BIOS-Extension

The chip set of the P7/106 includes a USB controller with 2 equivalent USB-interfaces. These interfaces are available in form of a double USB connector on the front panel of the P7/106. Most USB units that can be connected here require an operating system that offers a corresponding USB support (Windows 98 ...). For MSDOS or other, older operating systems, a driver support is not offered.

Implemented in the BIOS of the P7/106 is however a support of USB keyboards. It must, when required, first be enabled in the BIOS-Setup. For it, first the "On-Chip USB Controller" must be set to "enabled" in the sub-menu "INTEGRATED PERIPHERALS". Then, the "USB Keyboard Support" can be enabled.

Attention: If "USB Keyboard Support" is enabled (also if the "On-Chip USB Controller" is disabled and the field is thus not visible), the BIOS will load a USB-BIOS extension into the memory that assigns the next 16Kbyte block above the VGA-BIOS. At the standard VGA BIOS of the P7/106 (48KByte), the BIOS extension thus is within the memory area CC000h - CFFFFh. Periphery cards can therefore no longer reclaim memory space in this address area.

10.1.4 Problem: Interrupt Lines - Plug&Play

The ISA96 P7/106 is a board for the ISA96 respectively AT96-Bus. Internally, it however mainly consists of many PCI components, many of which are already integrated to the chip set of the P7/106. Among them are the two IDE controllers, the Power Management unit, and the serial bus controller for USB. Furthermore, the P7/106 still has an AGP video controller (AGP: Advanced Graphic Port, a PCI-Bus with 66MHz Bus frequency, especially for video controllers), and an Onboard PCI slot for, as example, the PCI Ethernet module. All in all, a system with the P7/106 consists of components for the ISA-Bus as also from PCI components, where two different conceptions collide.

Componentries for the ISA(96) Bus usually do not allow for Plug&Play. At least, this holds for all Janich&Klass ISA96/AT96 componentries. This means for the practice that the resources required concerning interrupt lines, I/O and memory addresses are either firmly fixes, or must be firmly set (by jumpers, DIP switches, or via software that is however specially suited to the actual componentry). A BIOS or an operating system is therefore not able to recognize and to administrate the resources required by the componentries.

This leads to frequent conflicts, whenever two or more ISA componentries assign the same interrupt, I/O or memory addresses.

It is different at PCI components: They have to be freely configurable by software concerning their interrupt and DMA line, I/O and memory area. The task of configuration is affected by the BIOS while booting the system. The BIOS recognizes all PCI components existing within the system and is therefore able to distribute the resources (as long as they are not exhausted) to the PCI components without conflicts.

If you now have PCI and also ISA components in one system, this may lead to problems when assigning the interrupt lines (and the DMA channels), as the BIOS is unable to recognize which interrupts are eventually already occupied by ISA components. If now the BIOS assigns such an occupied interrupt line to a PCI component, the latter will work trouble-free, but for the corresponding ISA component, all interrupt requirements are ignored (from the hardware side)!

In order to avoid these problems, you can set in the BIOS-Setup of the P7/106 which IRQs and DMAs may be administrated by the BIOS, respectively which are exclusively reserved for the ISA-Bus. For it, the field "**Resources Controlled By :**" in the BIOS Setup sub-menu "**PNP/PCI CONFIGURATION**" must be set to "**Manual**". Only then fields will appear for all interrupt lines and DMA channels available on the ISA-Bus. Here, two settings are possible:

- "**PCI/ISA PNP**" This is the Plug&Play setting. The BIOS may use this resource and assign it to a PCI component. Otherwise, this resource is available to an ISA-Bus component.
- "**Legacy ISA**" This setting forbids the BIOS to make use of this resource. This setting should be made for all IRQ lines and DMA channels which are used by ISA components!

In this connection, the two onboard IDE controllers are an exception. If those are enabled in the BIOS-Setup, they always assign IRQ14 (Primary IDE) respectively IRQ15 (Secondary IDE), also if the setting for this interrupt line is "Legacy ISA"!

If PCI components require more interrupt lines than available for the BIOS (i.e. released in the Setup with "PCI/ISA PNP"), as many PCI components get **not** assigned an interrupt, so that these components will eventually not work troublefree!

The assignment of interrupt lines to PCI components is displayed by the BIOS during POST (after switch-on respectively after a Reset) on the screen "PCI device listing ...". If the column "IRQ" shows "NA" (Not Available) at a component, its settings concerning interrupts should immediately be checked in the BIOS-Setup!